

Remarks

Applicant has carefully reviewed the Application in light of the final Office Action dated June 5, 2000. After conducting this review, Applicant believes that the pending claims are allowable over the Examiner's rejections. Thus, Applicant respectfully requests reconsideration and favorable action in this case.

Section 112, ¶ 2 Rejections

The Examiner rejects Claims 18-28 under 35 U.S.C. § 112, ¶ 2 "as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention." (Detailed Action ¶ 3). According to the Examiner, "Claims 18-28 call for 'the direction of travel of the housing'," but "[p]roper antecedent basis for the direction of travel of the housing has not been established." (Id.). Additionally, the Examiner asserts, "[t]he claims further call for a second direction being perpendicular to the first direction," which "makes the claim language indefinite since the direction of travel of the housing is not necessarily 'approximately parallel' to the second direction for the second image capture." (Id.). Applicant, however, disagrees with these rejections.

According to the M.P.E.P., a claim is definite if "the scope of the claim is clear to a hypothetical person possessing the ordinary level of skill in the pertinent art." (M.P.E.P. § 2171). Moreover, whether a claim is definite should not be

analyzed in a vacuum, but in light of the content of the specification. (M.P.E.P. § 2173.02). Thus, the failure to provide specific antecedent basis for a term does not always render a claim indefinite, because it depends on whether the term would be reasonably clear to one skilled in the art. (M.P.E.P. § 2173.05(e)). Furthermore, inherent components of elements previously recited have antecedent basis in the recitation of the components themselves. (Id.).

Based on these teachings, Applicant submits that Claims 18-28 are not indefinite. To begin, Applicant submits that it is inherent that an object travels in only one direction at any given time, unless the object is simultaneously changing shape, which a housing ordinarily would not do. Thus, it is an inherent property of a housing that it has only one direction of travel at a given time, which would be "the direction of travel of the housing." Accordingly, the phrase "the direction of travel of the housing" merely recites an inherent property of "the housing," allowing the phrase to not require antecedent basis. Moreover, the Application describes particular embodiments of Applicant's invention as being useful in passages, such as, for example, water wells, bore holes, and pipes, (pg. 3, ll. 3-8; FIGURE 1), where the direction of travel would be along the passage, which provides context to "the direction of travel of the housing." Thus, "the direction of travel of the housing" does not require antecedent basis because it is an inherent property of "the housing" and, moreover, because it would be reasonably clear to one skilled in the art from the context provided by the Application. In addition,

Applicant submits that the limitation that the image sensor is "further operable to capture an image in a second direction, the second direction approximately perpendicular to the first direction" clearly does not imply that the image sensor captures the second image in a direction that is "approximately parallel" to the direction of travel of the housing, as the Examiner asserts, but in a direction that is approximately perpendicular to the direction of travel, i.e., as the claim specifies, "the second direction is approximately perpendicular to the first direction." Thus, one skilled in the art would find this limitation reasonably clear. For at least these reasons, Applicant submits that these limitations are not indefinite and, therefore, respectfully requests the Examiner to withdraw the § 112, ¶ 2 rejection of Claims 18-28.

Section 102 Rejections

The Examiner rejects Claims 1-4 and 9-13 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,532,544 issued to Federau ("Federau").¹ (Detailed Action ¶ 5). Applicant, however, disagrees with the Examiner's rejections.

To anticipate a claim, a prior art reference must describe, explicitly or implicitly, each and every element as forth in the claim. (M.P.E.P. § 2131). Thus, if the prior art reference fails to describe at least one element as set forth in the

¹ The Examiner also indicates that Claims 14-17 and 33 are rejected under § 102(b) as being anticipated by Federau. However, the Examiner provides no supporting reasoning as to why these claims are anticipated by Federau and proceeds to reject the claims under § 103 with supporting reasoning. Thus, Applicant believes that the Examiner only meant to reject these claims under § 103 and, accordingly, will only respond to those rejections of

claim, the reference cannot anticipate the claim. Applicant submits that *Federau* does not describe each and every element in any of Claims 1-4 and 9-13 and, hence, that these claims are allowable over *Federau*.

Federau teaches using a television camera for imaging the side of a bore hole. (Col. 3, ll. 44-47; Figure 1). The camera has an optical imaging system 11 that transfers an image of an angular section of a particular length of the side of the bore hole onto a line sensor 23. (Col. 3, line 56 - col. 4, line 3). Line sensor 23 detects the transferred image. (Col. 4, ll. 2-13). The camera can be rotated about the longitudinal axis 7 of the bore hole, which is aligned with the panoramic axis 1 of the camera, to produce a 360° image of the particular length of the side of the bore hole. (Id.). In addition, the camera can be lowered further into the bore hole to image another particular length of the side of the bore hole. (Col. 3, ll. 6-10). Note that the camera in *Federau* does not have two image sensors; it simply rotates the camera, to which line sensor 23 is attached, 360° to image a particular length of the side of the bore hole.

Applicant's invention as recited in Claim 1, however, includes elements that *Federau* does not describe. Claim 1 recites:

A video inspection system comprising:
a first image sensor operable to acquire an
image in a first direction along a first axis;

these claims. If, however, Applicant's belief is incorrect, Applicant respectfully requests the Examiner to so advise and to provide supporting reasoning for rejecting these claims under § 102(b).

a second image sensor operable to acquire an image in a second direction essentially perpendicular to the first direction; and

a camera board and processor coupled to the first image sensor and the second image sensor, the camera board and processor operable to receive an image from either the first image sensor or the second image sensor and prepare the image for display.

Nowhere, however, does *Federau* describe "a first image sensor operable to acquire an image in a first direction" and "a second image sensor operable to acquire an image in a second direction essentially perpendicular to the first direction," because *Federau*, as previously discussed, only has one image sensor - line sensor 23. Note, the Examiner cites the same portion of *Federau* - "(col. 4, lines 2-13)" - as teaching both "a first image sensor" and "a second image sensor." But this portion only teaches one image sensor - line sensor 23 - rendering the rejection insufficient because *Federau* does not describe "a first image sensor" and "a second image sensor." For at least these reasons, Applicant respectfully requests the Examiner to withdraw the § 102 rejection of Claim 1.

Claims 2-4 and 9-13 depend from Claim 1, already shown to be allowable over *Federau*, and contain additional elements that *Federau* does not describe. For example, Claim 2 specifies that "the second image sensor is an array of image sensors operable to simultaneously acquire an image 360 degrees around the first axis." Nowhere, however, does *Federau* describe such an image sensor, because line sensor 23 of *Federau* must be rotated around panoramic axis 1 to image 360° of a particular length of the side of the bore hole. Thus, line sensor 23 does not

"simultaneously acquire an image 360 degrees around the first axis." Accordingly, *Federau* does not describe all of the elements of Claim 2 and, therefore, does not anticipate it. As another example, Claim 4 specifies that "the first axis is parallel to the long axis of the pipeline." *Federau*, however, only acquires images along axes that are perpendicular to the longitudinal axis 7 of the bore hole, not along an axis "parallel to the long axis of the pipeline." Thus, *Federau* does not teach or suggest all of the elements of Claim 4 and, hence, fails to anticipate it. As a further example, Claim 9 specifies that "the first image sensor, the second image sensor, and the camera board and processor are mounted in a camera assembly operable to rotate about the first axis when the second image sensor is acquiring an image." According to the Examiner's analysis, however, the first axis in *Federau* is perpendicular to the longitudinal axis 7 of the bore hole. (Detailed Action ¶ 5). But *Federau* teaches that the camera is rotated about the longitudinal axis 7 to acquire a 360° image of the side of the bore hole, not about an axis perpendicular to this axis. Thus, according to the Examiner's analysis, *Federau* fails to describe all the elements of Claim 9 and, therefore, fails to anticipate it. For at least these reasons, and for the reasons given with respect to Claim 1, Applicant submits that Claims 2-4 and 9-13 are patentably distinguishable over *Federau* and, hence, respectfully requests that the Examiner withdraw the § 102 rejection of these claims.

Section 103 Rejections

The Examiner rejects Claims 5-8, 14-17, and 29-33 under 35 U.S.C. § 103(a) as being unpatentable over *Federau* in view of U.S. Patent No. 5,652,617 issued to Barbour ("*Barbour*") and U.S. Patent No. 5,528,453 issued to Berman, et al. ("*Berman*"). (Detailed Action ¶ 7). Applicant, however, disagrees with these rejections.

In order to establish that a claim is prima facie obvious based on multiple references, there must be some suggestion or motivation to combine the teachings of the references, and the combination must teach or suggest all the limitations of the claim. (M.P.E.P. § 2142). Thus, if there is no suggestion or motivation to combine the teachings of the references, or if the combination does not teach or suggest at least one claim limitation, the combination does not render the claim obvious. Applicant submits that the combination of *Federau*, *Barbour*, and *Berman* fails to teach or suggest every limitation in any of Claims 5-8, 14-17, and 29-33 and, hence, that these claims are patentably distinguishable over these references.

Barbour teaches an apparatus for visually examining the side walls of a bore hole. (Abstract). The apparatus includes a down hole video tool 8 that has a video camera 52 positioned at its tip and a rotatable side camera 200 mounted inboard from video camera 52. (Abstract; col. 7, line 57 - col. 8, line 15; Figure 1).

Berman teaches a video recording equipment travel cart. (Abstract). The cart includes one compartment that is detachable from a main compartment and another compartment that

is hingedly attached to the main compartment. (Id.). The cart also includes casters for easy rolling, a foam cushioned interior for protecting the equipment, and cabling to make required connections with the equipment. (Id.).

Claims 5-8 and 14-17 depend from Claim 1, already shown to be allowable over *Federau*, and contain additional limitations that none of *Federau*, *Barbour*, or *Berman* teaches or suggests. For example, Claim 8 specifies that "the coaxial cable passes over a cable arm encoder operable to determine the depth of the camera and display it on the monitor with the output of the camera board and processor." Nowhere, however, does *Federau*, *Barbour*, or *Berman* teach or suggest such a configuration. Note, the Examiner's citation of *Federau* for this teaching - "(See *Federau* fig. 1, encoder 45, and col. 4, ll. 58-68)" - only teaches an angle encoder used to determine the orientation of the camera relative to longitudinal axis 7 of the bore hole, not "a cable arm encoder operable to determine the depth of the camera." Moreover, none of *Federau*, *Barbour*, or *Berman* teaches or suggests that a "coaxial cable passes over a cable arm encoder." Thus, the combination of *Federau*, *Barbour*, and *Berman* fails to teach or suggest all of the limitations of Claim 8 and, hence, does not render it obvious. For at least these reasons, and for the reasons given with respect to Claim 1, Applicant submits that Claims 5-8 and 14-17 are patentably distinguishable over the combination of *Federau*, *Barbour*, and *Berman* and, hence, respectfully requests the Examiner to withdraw the § 103 rejection of these claims.

Claim 29 is an independent claim containing limitations that none of *Federau*, *Barbour*, or *Berman* teaches or suggests. Claim 29 recites:

A system for video inspection of a passage comprising:

a carrying case having a deep housing and a removable cover;

a spool adapted for storing coaxial cable inside the carrying case, the coaxial cable exiting the carrying case at an opening;

a cable arm supported by an adjustable leg, the cable arm attached to the carrying case, the cable arm operable to have the coaxial cable pass over it; and,

a camera assembly, coupled to the coaxial cable, having a single camera operable to capture an image in a first direction along a long axis and capture an image in a second direction, the second direction ninety degrees offset from the first direction.

Nowhere, however, does *Federau*, *Barbour*, or *Berman* teach or suggest "a camera assembly ... having a single camera operable to capture an image in a first direction along a long axis and capture an image in a second direction, the second direction ninety degrees offset from the first direction." *Federau*, as discussed previously, only has an image sensor 23 that can acquire an image of the side of the bore hole, not "in a first direction along a long axis and ... in a second direction, the second direction ninety degrees offset from the first direction." And *Barbour*, also as discussed previously, only has one camera for viewing down the bore hole and one camera for viewing the side of the bore hole, not "a single camera operable to capture an image in a first direction along a long axis and capture an image in a second direction, the second direction

ninety degrees offset from the first direction." Furthermore, *Berman* teaches a travel cart for recording equipment, not "a camera assembly ... having a single camera operable to capture an image in a first direction along a long axis and capture an image in a second direction, the second direction ninety degrees offset from the first direction." Thus, none of the references teaches or suggests these limitations of Claim 29, and hence, the combination does not render Claim 29 obvious. For at least these reasons, Applicant submits that Claim 29 is patentably distinguishable over the combination of *Federau*, *Barbour*, and *Berman* and, thus, respectfully requests the Examiner to withdraw the § 103 rejection of Claim 29.

Claims 30-32 depend from Claim 29, already shown to be allowable over the combination of *Federau*, *Barbour*, and *Berman*, and contain additional limitations that none of *Federau*, *Barbour*, or *Berman* teaches or suggests. For example, Claim 32 recites "a cable arm encoder operable to measure the length of cable to determine the distance the camera assembly has traveled." But as discussed with respect to Claim 8, none of *Federau*, *Barbour*, or *Berman* teaches or suggests such an encoder. Thus, the cited references fail to teach or suggest all of the limitations of Claim 32, and therefore, Claim 32 is not obvious in light of these references. For at least these reasons, and for the reasons given with respect to Claim 29, Applicant submits that Claims 30-32 are patentably distinguishable over the combination of *Federau*, *Barbour*, and *Berman* and, thus, respectfully requests the Examiner to withdraw the § 103 rejection of these claims.

Claim 33 is another independent claim containing limitations that none of *Federau*, *Barbour*, or *Berman* teaches or suggests. Claim 33 recites:

A video inspection system comprising:
a camera assembly including:
 an upper section having a camera card;
 a stepper motor coupled to the end of the upper section; and
 a lower section coupled to the upper section and the stepper motor, the lower section operable to rotate about an axis when the stepper motor is operational, the lower section further comprising:
 an upper part having a high torque dc motor; and
 a lower part coupled to the upper part by a pivoting means, the pivoting means driven by the high torque motor and operable to pivot the lower part from a down view to a side view, the lower part further comprising an image sensor coupled to the camera card and operable to acquire an image in a down position and a side position and any position in between, the image sensor further operable to acquire an image as the lower section rotates about an axis.

Nowhere, however, does *Federau*, *Barbour*, or *Berman* teach or suggest "a stepper motor coupled to the end of the upper section." *Federau* only teaches a rotational drive 44 that rotates the camera about the longitudinal axis 7, (Col. 4, ll. 40-57), and *Barbour* only teaches a DC motor to turn rotary driver 300. (Col. 10, ll. 22-23). Furthermore, *Berman* teaches nothing remotely related to a drive mechanism. Hence, there is no teaching or suggestion of "a stepper motor coupled to the end of the upper section." Additionally, none of the cited references teaches or suggests "a lower part coupled to the

upper part by a pivoting means, the pivoting means driven by the high torque motor and operable to pivot the lower part from a down view to a side view, the lower part further comprising an image sensor ... operable to acquire an image in a down position and a side position and any position in between." As discussed previously, *Federau* only images the sides of the bore hole and, hence, does not teach or suggest "a pivoting means ... operable to pivot the lower part from a down view to a side view." Additionally, neither video camera 52 nor side camera 200 of *Barbour* pivots "from a down view to a side view," and, thus, *Barbour* does not teach or suggest "a pivoting means ... operable to pivot the lower part from a down view to a side view." Furthermore, *Berman* teaches nothing remotely related to a "pivoting means." Moreover, none of these references teaches or suggests "an image sensor ... operable to acquire an image in a down position and a side position and any position in between." Note, in his rejection of Claim 33, the Examiner asserts that rotational drive 44 of *Federau* generates the claimed high torque. (Detailed Action ¶ 7). However, rotational drive 44 in *Federau* only rotates the camera about longitudinal axis 7 of the bore hole, (Col. 4, ll. 40-57), not "from a down view to a side view." For at least these reasons, Applicant submits that Claim 33 contains limitations that none of *Federau*, *Barbour*, or *Berman* teaches or suggests and, hence, that these references do not render the claim obvious. Accordingly, Applicant respectfully requests the Examiner to withdraw the § 103 rejection of this claim.

Conclusions

Applicant has made an earnest attempt to place this Application in condition for allowance. For the foregoing reasons, and for other reasons clearly apparent, Applicant respectfully requests full allowance of all pending claims. If the Examiner feels that a telephone conference or an interview would advance prosecution of this Application in any manner, the undersigned attorney for Applicant stands ready to conduct such a conference at the convenience of the Examiner.

Although no fees are believed to be due at this time, the Commissioner is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 02-0384 of Baker Botts L.L.P.

Respectfully submitted,

Baker Botts L.L.P.
Attorneys for Applicant

William R. Borchers

William R. Borchers
Reg. No. 44,549

2001 Ross Avenue
Dallas, TX 75201
(214) 953-6987

Date: August 2, 2000